Yoshida in view of Lee et al. (US 6,259,744). The Applicants respectfully traverse these rejections based on the points set forth below.

Claim 30 defines a receiving apparatus having a plurality of demodulators that each demodulates a received symbol based on a different demodulation pattern. Each of the demodulation patterns corresponds to a single and unique bit of an idealized modulation constellation. A detector associated with each demodulator determines whether the demodulated information represents a correctly received bit or a bit perceived to be errantly received. The bits perceived to be received correctly are used to regenerate the information represented by the received symbol.

The Applicants submit that Yoshida fails to disclose the claimed features of: (1) a plurality of demodulators that each has a different demodulation pattern corresponding to a single and unique bit of an idealized modulation constellation, and (2) each demodulator applies its unique demodulation pattern to a received symbol to demodulate a received value for the demodulator's corresponding single and unique bit.

By contrast to the above-noted claimed features, Yoshida discloses a plurality of demodulators that each demodulates a received symbol using a different demodulation scheme so as to

produce the number of demodulated bit values corresponding to the applied demodulation scheme. More specifically, Yoshida discloses, in Fig. 6, a receiver having a QPSK demodulator 506, a 16QAM demodulator 507, and a 64QAM demodulator (see Yoshida col. 11, lines 66-67). The QPSK demodulator 506 demodulates a received symbol to produce two bits representing the received symbol, the 16QAM demodulator demodulates the received symbol to produce four bits representing the received symbol, and the 64QAM demodulator demodulates the received symbol to produce six bits representing the received symbol (see Yoshida col. 12, lines 1-2).

Thus, the Applicants note that none of Yoshida's demodulators 506-508 demodulates a received symbol to produce a value representing only a single bit of a constellation pattern, as do the claimed demodulators. Instead, each of Yoshida's demodulators produces values for each of the bits of the applied M-ary demodulation scheme. More specifically, Yoshida's QPSK demodulator 506 always produces values for two bits to represent the received symbol, Yoshida's 16QAM demodulator 507 always produces values for four bits to represent the received symbol, and Yoshida's 64QAM demodulator 508 always produces values for six bits to represent the received symbol.

Each of the claimed demodulators always produces a value for a single and different bit of a constellation pattern.

Accordingly, the Applicants submit that Yoshida does not anticipate the subject matter defined by claim 30. Independent claim 33 similarly recites the above-mentioned features distinguishing claim 30 from Yoshida. Therefore, the rejections applied to claims 31, 32, and 34-42 are overcome and allowance of claims 30 and 33 and all claims dependent therefrom is warranted.

To promote a better understanding of the differences between the claimed subject matter and Yoshida's disclosure, the Applicants provide the following additional remarks.

The claimed invention relates to a receiving apparatus, in a system using an adaptive modulation scheme, that includes a demodulator which independently performs demodulation per bit as a demodulator common to a plurality of modulation schemes. After separately demodulating each bit of a received signal, the receiving apparatus performs error detection for each demodulation result and employs the bits having no detected error in reproducing the information represented by the received symbol.

Accordingly, a plurality of bits subjected to M-ary modulation by the transmitting side can be demodulated independently of each other and also can be demodulated using a

method common to all modulation schemes. Therefore, only one demodulator is required.

Although Applicants' figures show a plurality of demodulators, these demodulators each demodulate 1 bit. The figures show decomposed demodulators to illustrate in detail how one demodulator demodulates M-ary demodulated signals.

For example, when BPSK, QPSK, 6QAM, 16QAM, 32QAM and 64QAM are prepared as modulation schemes, with 64QAM being the largest modulation level among them, 6 bits are transmitted in one 64QAM transmission, and therefore six demodulators each demodulating 1 bit are provided. This is the same as one 64QAM demodulator which has six demodulators each demodulating 1 bit.

In addition, the demodulator can also demodulate signals modulated by a modulation scheme other than 64QAM. For example, when QPSK is selected as a modulation scheme, the demodulation is performed by using two demodulators (equal to one QPSK demodulator) each demodulating 1 bit. Therefore, one demodulator having six demodulators each demodulating 1 bit is used in common as a BPSK demodulator, a QPSK demodulator, an 8QAM demodulator, a 16QAM demodulator, a 32QAM demodulator, and a 64QAM demodulator.

By contrast with this, Yoshida discloses an adaptive modulation communication system including a plurality of demodulators corresponding to modulation schemes so that a

receiving apparatus can demodulate received signals even if a transmission apparatus modulates signals using any modulation scheme. According to Yoshida, after all demodulators demodulate received signals, the receiving apparatus calculates error values for the demodulation results and selects a minimum error value. Thus, according to Yoshida, the receiving apparatus is required to have a plurality of demodulators corresponding to the modulation schemes.

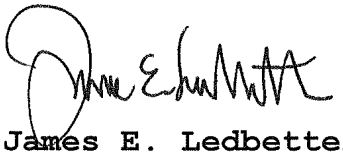
For example, when BPSK, QPSK, 8QAM, 16QAM, 32QAM, and 64QAM are prepared as modulation schemes, according to Yoshida, it is necessary to separately provide a BPSK demodulator, a QPSK demodulator, an 8QAM demodulator, a 16QAM demodulator, a 32QAM demodulator and a 64QAM demodulator.

Therefore, in a system using an adaptive modulation scheme in the related art such as Yoshida, it is necessary to provide a plurality of demodulators; however, in the present invention, it is only necessary to provide one demodulator. This has been achieved by adopting a particular transmission method where bits in the same position in a plurality of symbols are in the same error correction blocks.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,



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